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TITLE: THE RESPONSE TOPOGRAPHY OF ERG B-WAVE AMPLITUDE DENSITIES WITH ECCENTRICITY USING THE M-SEQUENCE-STIMULATION-TECHNIQUE.

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Purpose:- The m-sequence stimulation technique (Sutter & Trans, Vis Res 32: 433-446, 1992) allows functional mapping of the retina by ERG recordings. We examined the variation in the b-wave amplitude densities with eccentricity in 15 controls.
Methods:- The stimulus is presented on a monitor (75 Hz), 32 cm distance from the subjects eye. It contains 61 hexagons in a 25 degree visual field. Each element alternates between black and white (89% contrast) following a binary m-sequence. The ERG recording (gain 160k, high/low pass filter 10-300 Hz) is made using H-K loop scleral electrodes for a period of 15 minutes. The local ERG response of the retina is analysed for 61 stimulated areas with a fast m-transform algorithm and the mean of the b-wave amplitude densities for the 15 controls were calculated for each of the 61 elements.
Results:- The b-wave amplitude densities for the 61 elements of the left eye (mean of 15 controls, age 16-52, median 32) ranged from 6.9 nV/sqdeg (SD 1.9 nV/sqdeg) for the central element to 1.2 nV/sqdeg (SD 0.4 nV/sqdeg) for the peripheral element on the temporal field. These results show an asymmetrical central peak with higher amplitude density within 5° of the nasal field.
Conclusions:- The multi-input ERG technique allows objective assessment of retinal function. The test, although short, yields a good signal to noise ratio and the use of H-K loop electrodes balances a stable signal with minimal patient discomfort. Since retinal illumination was not controlled the inter-subject variation in amplitude was high. However, the authors feel normalised amplitude densities can be used as a template for detection of relative retinal abnormalities since they are independent of the inter-subject variation caused by differences in retinal illumination.

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RESULTS OF VISUAL EVOKED POTENTIAL MAPPING IN CHILDREN WITH DISBINOCULAR AND REFRACTIVE AMBLYOPIA.

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Rurpose. The objective of this study is to investigate the neurophysiological mechanisms in development of amblyopia of various genesis.
Methods. Visual evoked potentials to the flash in 16 leads situated throughout the scalp have been recorded. After the healthy and amblyopic eye stimulation the latency and P 100 peak amplitude in the occipital lead on the contra- and ipsilateral sides have been analysed while processing the results.
Results. Fourteen children with disbinocular and ten children with refractive amblyopias were studied. In disbinocular amblyopia where the visual acuity was under 0.2 after stimulation of the healthy eye the amplitude on the contralateral side was noted to be higher than on the ipsilateral one.In refractive and disbinocular amblyopias where the visual acuity was over 0.2 no similar correlation was noted.
Conclusion. The results of the investigation most probably give evidence of a great number of neurons participating in the response of the contralateral cortex visual area while the healthy eye is being stimulated or less inhibited on the part of cortical and subcortical structures due to less contribution of the temporal retina of the amblyopic eye to the optic process in strabismus convergens. In refractive and disbinocular amblyopias with visual acuity in the amblyopic eye over 0.2 these mechanisms have not been manifested.

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MODEL OF MOTION-ONSET VEPs DEPENDENCE ON STIMULUS CONTRAST AND SPATIAL FREQUENCY

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Purpose: An attempt was done to describe mathematicaly high contrast sensitivity of the magnocellular system when it is activated by motion-onset stimulation (Kubová et al.: Vision Res., 35: 197-205, 1995).
Methods: Motion-onset VEPs (M-VEPs) were examined in five healthy subjects. Motion stimulus was generated on 21" PC monitor (screen size 40°x30°). A checkerboard pattern with contrast (C) in the range from 0.003 to 0.96 and spatial frequency (SF) of 0.23 - 7.5 c/deg moved at velocities between 16.3 and 0.5 deg/s to keep the temporal frequency of the stimulus constant (3.75 Hz). Minimum square errors method was applied for VEP parameters to obtain a model.
Results: The following models of M-VEP latency and amplitude changes (peak N_{170}) in shifts of contrast and SF were developed:

$$latency\,[ms] = c_{L1} + c_{L2}SF + c_{L3}\exp(c_{L4}/SF)/C,$$

$$amplitude[\mu V] = c_{A1} + c_{A2}/SF + c_{A3}SF^{c_{A4}}\ln C + (c_{A5} + c_{A6}\ln SF)\ln^2 C$$

The coefficients c_L and c_A for a particular subject can be determined from M-VEPs to at least four (six) different stimulus conditions.
Conclusions: 1) Very tight correlation between the models and N_{170} parameters proves the specificity of the response to a given motion stimulation. 2) The models allow to predict parameters of M-VEPs in a wide range of stimulus conditions and to estimate an optimum stimulus conditions for a particular subject.

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PATTERN VEP REGISTRATIONS WITH THE TOMEY PE/PS-400 - CLINICAL PROTOCOLL AND NORMAL VALUES

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Purpose: Due to its easy handling and its relative low price the Tomey PE/PS-400 became quite popular and is widely distributed, although it is not in full compliance to recommendations of the final draft of the ISCEV-Standard for VEP-registrations[1]. In this study we present a clinical protocoll and the normal values for VEP-registrations with the Tomey PE/PS-400.
Methods: We examined 60 eyes of 60 healthy volunteers with the Tomey PE/PS-400 VEP-unit. We performed transient [1.5 Hz] and steady state [5.5 Hz] VEP-recordings with check sizes of 15', 30' and 60' at a distance from the forehaed of the proband to the monitor surface of 56 cm, each session with 128 sweeps. The monitor was presented at an visual angle of 19.5° x 12°. The mean brightness of the light was 37.6cd/m^2 and 1.4 cd/m^2 of the dark. squares, the contrast was 93%, the room illumnation approximately 20 cd/m^2.
Results: From our data we calculated the medians and the 5% and 95% percentile (percentiles in [ ]) for the three check sizes of transient and steady state VEPs. 15' trans. N70 99.2ms [91.5-109], P100 127.75ms [118.5-142.25], amplitude 8.25uV [3.8-15.3], 15' steady state amplitude 5.03uV [2.12-8.69]; 30' trans. N70 89.0ms [84.5-96.3], P100 117.25ms [109.75-125.25], amplitude 10.19uV [3.94-17.69], 30'steady state amplitude 7.6uV [3.0-13.5]; 60' trans. N70 83.75ms [71.5-93.0], P100 114.0ms [105.6-124.0], amplitude 8.94uV [3.6-16.37], 60' steady state amplitude 8.19uV [2.94-13.31]
Conclusions: The PE/PS-400 does not fullfil the drafted ISCEV recommendations for VEP-recordings. The the luminance of the pattern stimulator is too low and its color is black-yellow instead of black-white. Because the delay in implicit time is stable (about 20ms for N70 and P100), and the curve shape is similar to those recorded by VEP-units which fulfill the standard [1], the PE/PS-400 may be used a a screening device with normative values shown above.
[1] Harding et al., STANDARD FOR VISUAL EVOKED POTENTIALS (1995), Final draft.